

Remarks / Arguments

With the cancellation of claims 1-14 and 16-20, and the addition of new claims 21-39, claims 15, and 21-39 are pending in the present application. Claim 15 has been amended to better clarify the claimed invention. No new matter is introduced herein.

Claims 1-20 stand rejected under 35 USC 112, first paragraph, as failing to comply with the enablement requirement because they contain “subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.” The Examiner contends that there is no structure or diagram provided to show one of ordinary skill in the art how the data signals driving the modulators are synchronized and have the same data rates, as recited in now-pending independent claims 15 and 30.

Applicants are surprised that this issue is being raised again after having been addressed in Amendment A, dated December 6, 2006, and not raised in the subsequent Office Action of February 28, 2007. As previously argued in Amendment A, the provision of synchronous data signals is well-known to a person of ordinary skill in the art. Moreover, a person of ordinary skill in the art would know how to synchronize two data signals or generate two data signals that are synchronous. In addition, it is common for two or more data signals to have the same data rate.

Furthermore, with reference to the Examiner’s implication to the contrary (see Office Action, Response to Arguments, page 13), the fact that synchronization of data signals is well known, is not at all inconsistent with Applicants’ arguments in Amendment B regarding the patentability of the independent claims, which include the limitation of “modulators driven by synchronous data signals having the same data rate.” The fact that individual elements of a claim may be well known, does not imply that the combination of elements is obvious. Afterall, many inventions are combinations of well-known elements. Thus, the fact that the synchronization of data signals is well-known, does not imply that the inclusion of such a limitation in combination with other limitations as set forth in the claims of the present application is also well-known.

In light of the foregoing considerations, Applicants respectfully assert that the 35 USC 112, first paragraph rejection is not warranted and should be withdrawn.

Claims 1-17 and 19 stand rejected under 35 USC 112, second paragraph, as being indefinite. In particular, with respect to independent claims 1, 8 and 15, the Examiner states that “since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass.”

With the cancellation of independent claims 1 and 8, and in light of the fact that all pending claims are apparatus claims and not method claims, Applicants respectfully submit that the Examiner’s argument is inapposite and that the rejection under 35 USC 112, second paragraph, is moot.

Claims 1, 8 and 15 stand rejected under 35 USC 101, per the Examiner, “because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process.”

As with the 35 USC 112, second paragraph rejection discussed above, the cancellation of claims 1 and 8, and the fact that all pending claims are apparatus claims and not method claims, render the Examiner’s argument inapposite and the rejection under 35 USC 101 moot.

Claims 1, 2, 4-6, 8-13, 15 and 16 stand rejected under 35 USC 103(a) as being unpatentable over U.S. Published Patent Application No. 2003/0198478 to Vrazel et al. (hereinafter “Vrazel”) , in view of U.S. Published Patent Application No. 2003/0063698 to Bonthron et al. (hereinafter “Bonthron”), and further in view of U.S. Patent No. 6,563,623 to Penninckx et al. (hereinafter “Penninckx”).

While reserving the right to pre-date these references, Applicants respectfully submit that this rejection does not apply to the claims, as amended, even if these references are in fact prior art.

The Examiner contends that Vrazel discloses driving at least two modulators with at least two data signals to generate an optical signal using differential phase shift keying (DPSK) and amplitude shift keying (ASK), but concedes that Vrazel does not disclose that the data signals are synchronized and have the same data rate. The Examiner asserts that

Bonthron “teach[es] two modulators driven by synchronous signal (see paragraph [0003]).” For the following reasons, Applicants respectfully disagree.

Bonthron does not teach two modulators each driven by a respective data signal, wherein the data signals are synchronous. Rather, in the excerpt of Bonthron relied on by the Examiner, one optical modulator is driven by a data stream and another optical modulator is driven by a system clock that is synchronous to the data stream. A clock signal is not a data signal as it does not convey any data by which the optical signal is to be modulated. As such, the modulated output signal described therein conveys only one stream of data, as opposed to the multilevel coded optical signal of the claimed invention which conveys at least two streams of data. In other words, each symbol of the Bonthron modulated signal contains only one bit of data, whereas each symbol of the multilevel coded optical signal of the claimed invention contains at least two bits of data.

The Examiner also concedes that Vrazel does not disclose DPSK/ASK modulation with an extinction ratio of between about 5 dB and about 10 dB, as recited in independent claims 15 and 30, as amended. The Examiner simply points to Penninckx for the proposition that “it is well known that the optical signal has extinction ratio.” Penninckx, however, describes a Phase-Shaped Binary Transmission (PSBT) scheme, and not a DPSK/ASK scheme, as in the present invention. Applicants respectfully submit that the Examiner has not established how one of ordinary skill in the art can arrive at the recited range of extinction ratio values from the one value (7 dB) provided by Penninckx for a different transmission scheme (PBST).

For the foregoing reasons, Applicants respectfully assert that the rejection of claims 1, 2, 4-6, 8-13, 15 and 16 under 35 USC 103(a) does not apply to claims 15 and 21-39.

The Examiner has rejected claims 18-20 under 35 USC 103(a) as being unpatentable over U.S. Patent No. 6,626,589 to Epworth (hereinafter “Epworth”), in view of U.S. Published Patent Application No. 2004/0021829 to Griffin (hereinafter “Griffin”), and further in view of Penninckx.

With the cancellation of claims 18-20, this rejection is now moot. To the extent that the Examiner may attempt to apply this rejection to any pending claim, Applicants point out that Epworth describes a scheme in which the header of a data stream is modulated using

DPSK, whereas the payload, which follows the header at a later time, is modulated using ASK. The two types of modulation are temporally separated and are applied at different times to the data stream. In other words, unlike the DP-ASK modulation scheme of the present invention, the DPSK and ASK modulations described in Epworth do not act on an optical carrier at the same time. Thus, even if the teachings of Epworth were properly combinable with those of Griffin and Penninckx, there is no indication how Griffin and Penninckx would overcome this deficiency of Epworth.

Lastly, the Examiner rejects claims 3, 7, 14 and 17 under 35 USC 103(a) as being unpatentable over Vrazel in view of Bonthron, and Penninckx, and further in view of U.S. Patent Application Publication No. 2004/0125435 to Liu et al. (hereinafter "Liu").

With the cancellation of claims 3, 7, 14 and 17, this rejection is also now moot. To the extent, however, that the Examiner may attempt to apply this rejection to any pending claim, Applicants point to the arguments made above regarding Vrazel, Bonthron and Penninckx. While the Examiner asserts that Liu teaches the use of nonlinear-phase-shift compensation, there is no showing that Liu, even if properly combinable with those references, overcomes the above-discussed deficiencies of those references.

In view of the foregoing, Applicants respectfully submit that all pending claims in their present form are allowable. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If however, there remain any unresolved issues requiring adverse action in any of the claims now pending in this application, the Examiner is urged to contact the undersigned so that any such issues can be resolved as expeditiously as possible.

Respectfully submitted,

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